
Institute of Design

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Director:
Patrick F. Whitney

The Institute of Design (ID) is defined by a legacy of experimentation joined with unique academic programs and a systematic, analytical approach to design and problem solving. It has embraced new technology and experimentation since its founding by Laszlo Moholy-Nagy in 1937 as New Bauhaus. In 1944, the school was renamed the Institute of Design, and, in 1949, it merged with Illinois Institute of Technology.

ID's program is markedly different from other graduate design programs because of its insistence on user-centeredness, its development of rigorous, verifiable methods, and its emphasis on placing design at the center of the development process.

Today, the school has the nation's largest full-time, graduate program in design and offers a Ph.D. in design research. Students in the professional master's (M.Des.) program may specialize in design planning, design research, human-centered product design or human-

centered communication design. Students in the advanced Master of Design Methods (M.D.M.) program enroll in core and specialty courses and selected workshops focusing exclusively on advanced design methods.

ID's development of separate research and professional degrees addresses the new commitment of the field to the importance of design research, while recognizing the increasing demand for professional education at the mastery level. ID's research community is as unique as its curriculum. Faculty members are active contributors to the design field. The 12 full-time faculty and approximately 20 adjunct members represent specific areas of expertise critical to design, such as product design, communication design, information design, design planning, the history of design, interactive diagrams, cognitive psychology, anthropology, semantics of form, imaging, and computer science. Students draw upon these many perspectives to observe and analyze real-world environments as a means of designing information, visualizations, products and services that shape and are shaped by how people live.

Graduate students typically come to ID from all over the world, often after years spent in their professions. In addition to professional designers who enter the school, ID accepts and encourages students with backgrounds outside of design. The student body draws from backgrounds as diverse as chemistry, engineering, the fine arts, computer science, architecture, anthropology and psychology.

Degrees Offered

Master of Design (M.Des.)
Master of Design Methods (M.D.M.)

Doctor of Philosophy (Ph.D.)

Research Facilities

Research is supported by a networked computing system that enables students to digitize and manipulate photographic images, analyze problems, model forms, create interactive multimedia and individualized publications,

and develop new systems and tools. Equipment includes Silicon Graphics, Sun, Dell, and Apple computers and a wide variety of peripherals.

Research Areas

ID provides an unmatched community of faculty and students who are conducting essential design research. Interests are broad, but tend to focus on users' interactions with their environment, methods of innovation within organizations, and the value of design for business

and strategy. Doctoral students conduct research regarding the fundamental methods and principles of human-centered design and design planning in both symbolic and real dimensions.

Institute of Design

Faculty

Jeremy Alexis, Assistant Professor. B.Arch, M.Des., Illinois Institute of Technology.

Christopher Conley, Associate Professor, B.S., M.S., Illinois Institute of Technology.

Dale Fahnestrom, Professor. B.F.S., M.F.A., University of Illinois, Urbana-Champaign.

Judith Gregory, Assistant Professor. B.A., Antioch College. Ph.D., University of California-San Diego

John Grimes, Professor. B.A., University of Illinois. M.S., Illinois Institute of Technology.

Vijay Kumar, Associate Professor. B.S., National Institute of Design (India); M.S., Illinois Institute of Technology.

Charles Owen, Distinguished Professor Emeritus. B.S., Purdue University; M.S., Illinois Institute of Technology.

Greg Prygrocki, Associate Professor. B.I.D., University of Manitoba (Canada); M.V.A., University of Alberta (Canada).

Keiichi Sato, Professor. B.S., M.S., Osaka Institute of Technology; M.S., Illinois Institute of Technology.

Patrick F. Whitney, Professor and Director. B.F.A., University of Alberta (Canada); M.F.A., Cranbrook Academy of Art.

Admission Requirements

Cumulative undergraduate GPA minimum: 3.0/4.0
Minimum GRE score: 1000 (verbal & quantitative),
3.5 (analytical writing)
TOEFL minimum: 550
TSE (Test for Spoken English) minimum: 24

Admission to ID is highly competitive. Meeting the minimum GPA and test score requirements does not guarantee admission. Test scores and GPA are just two of several important factors considered. For admission to the master of design (M.Des.) program, an applicant must hold a baccalaureate degree from an accredited educational institution with a minimum cumulative GPA of 3.0/4.0, must have a strong record of academic achievement, and must be highly recommended. All applicants without an undergraduate degree in design must submit GRE scores. Applicants from countries whose native language is not English must submit scores for TOEFL and TSE. The TOEFL and TSE requirements are waived for applicants with a degree from universities in English-speaking countries.

Portfolios are required for applicants who possess design degrees. Regardless of previous degrees, students may be required to complete prerequisite design courses before starting their M.Des. requirements.

Applicants without design degrees are encouraged to apply to the M.Des. Program. Such applicants must complete a series of specified prerequisite design courses before starting the M.Des. degree requirements.

Applicants to the M.D.M. program must hold a four-year Bachelor's degree from an accredited university, possess outstanding visual skills as demonstrated in a professional portfolio or an exemplary portfolio of non-design innovation projects, and have a minimum of 5 years of management and leadership experience in design or innovation and a demonstrated record of excellence in the field (as in awards from IDSA, AIGA or other associations). Applicants must also submit three letters of recommendation from professional contacts, and have a successful interview with an Institute of Design faculty member.

Applicants to the Ph.D. program must hold a master's degree in design from an accredited educational institution, have a distinguished record of academic achievement and be very highly recommended. Applicants without a master's degree should apply for the M.Des. program.

Doctoral applicants with a Master's degree in design must show evidence of distinguished academic and, if appropriate, professional work in their fields. Applicants with design degrees or degrees from programs in related fields with studio courses must present a portfolio and may be required to complete some design courses as deficiency studies. All Ph.D. applicants must have completed college level courses in mathematics (calculus and statistics) and programming (Fortran, Pascal or C++). Depending on the applicant's academic background and intended area of study, other prerequisite courses also may be required. Admitted applicants who have not completed these courses must take them immediately.

Master of Design

54 credit hours
Project

The Master of Design (M.Des.) program is a two-year, 54-credit-hour degree program intended for those seeking professional mastery at the highest level in the field of communication or product design or design planning. The degree terminates with a project demonstrating the application of new theories and processes to contemporary and developing design problems in a variety of areas.

The program is divided into four concentration areas, or tracks: Human-centered Communication Design, Human-centered Product Design, Design Planning, and Design Research. All four tracks share a common platform of methods developed at ID and other design organizations which focuses on observing and understanding users in specific contexts, analyzing complex information, developing and exploring alternative solutions, and prototyping future innovations and scenarios.

Human-centered Communication Design

The communication design program applies human-centered methods to the creation of new communications, including interactive, electronic and print publications, information systems, software, Web services, and other media. Students explore how people send, receive, analyze, share and interact with information and rich media, and the influences of new technologies on how people can, should and do communicate.

Human-centered Product Design

ID's product design program focuses on physical products and environments. With the underlying goal of maximizing user experience, the program emphasizes both appearance and performance, and explores issues of

material and form, manufacturing, interaction, embedded computing, and product life cycles. Students are encouraged to go beyond designing an individual product, to designing holistic systems of products and environments that work together to meet user needs.

Design Planning

Students in design planning learn to apply design methods to business strategy and achieving competitive advantage. Particular attention is paid to how design, by creating new value for users, can also create economic value for organizations. Students gain an understanding of technological innovation, market forces, and organizational structures, and learn to create innovative solutions in a variety of areas, from products and communications to business strategies, brands, services and organizational processes.

Design Research

The design research track prepares professionals to work in industry, the public sector and academic institutions that seek to build design-related research and development programs from a human-centered perspective. Coursework focuses on the development and implementation of new design methods and tools, exploring and prototyping new concepts, and creating new procedures and standards for design activity. Career paths include corporate research and development, government design and technology agencies, teaching, and preparatory study for application to the Ph.D. program.

Residence

The M.Des. Program requires continuous full-time study at the Institute of Design for a minimum of four semesters. Students must enroll in at least 13.5 credit hours of course work each semester.

Curriculum

Totals 54 credit hours

Core classes

(13 credit hours)

The following eight project/discussion courses that deal with the basics of human-centered design are required for all master's students:

ID 559	Physical Human Factors
ID 551	Cognitive Human Factors
ID 552	Social Human Factors
ID 553	Cultural Human Factors
ID 533	Design Analysis
ID 514	Design Planning
ID 516	Observing Users
ID 517	Design Languages

Professional Sequence

(32 hours)

Students select a series of projects and courses from available workshops and specialty courses to meet the objectives of the student's professional goals in their chosen track. Choices will be made in consultation with the student's adviser and will account for at least 32 credit hours of the required program.

The professional sequence includes eight (8) credit hours of workshops, which are major, semester-long project courses that explore design problems in breadth and depth. Processes and information from the specialty courses are developed here in practical and experimental applications. Choices are made in consultation with the student's adviser from ID 580-589.

Institute of Design

Twelve (12) credit hours in the professional sequence are composed of specialty track courses, which are classes in special branches of design theory process or practice.

Selections must include courses from the student's chosen track. Full- or half-semester courses are selected from ID 519–579.

The remaining twelve (12) credit hours in the sequence are composed of a final, one- to two-semester long Research and Demonstration project in the chosen track (ID 592).

Electives

(9 hours)

Full- or half-semester courses selected from the university's course offerings to complement objectives of the student's program. These courses should be at least 400-level and should be selected with adviser approval.

Master of Design Methods

30 credit hours

The Master of Design Methods (MDM) is a nine month (or 2-3 year part-time) executive master's degree for exceptional design, management, engineering and other professionals who wish to acquire robust design methods and frameworks and to apply design thinking to the development of products, communications, services, and systems. MDM courses cover design methods and frame-

works in areas like user observation and research; prototyping of new services, products and businesses; creating systems of innovation; visualizing alternative futures; and linking user innovation to organizational strategy.

Residence

The M.D.M. can be taken in two semesters full-time, four semesters half time, or six semesters at one-third time.

Curriculum

Totals 30 credit hours

Required classes

(13 hours)

The following four, half-semester, project/discussion courses that deal with fundamental aspects of design at an abstract, theoretical level are required for all M.D.M. students:

ID 559	Physical Human Factors
ID 551	Cognitive Human Factors
ID 552	Social Human Factors
ID 553	Cultural Human Factors

Substitutions to these courses may be made according to the student's professional background.

Design Workshops

(0-8 hours)

Workshops are major, semester-long project courses that explore design problems in breadth and depth. Processes and information from the specialty courses are developed here in practical and experimental applications. Choices are made in consultation with the student's adviser from ID classes numbered 580-589.

Specialty Courses

(9-17 hours)

Specialty courses are courses in special branches of design theory, process or practice, and are normally selected from half-semester courses, ID 519-579.

Dual degree programs

M.Des./M.B.A.

The Master of Design/Master of Business Administration (M.Des./M.B.A.) dual degree program is a two year plus one quarter, full-time program of study culminating in the awarding of both an M.Des. degree from the Institute of Design, and an M.B.A. degree from the Stuart School of Business.

Pursued separately, earning both degrees would require more than three years of continuous study, as well as separate application processes. The M.Des./M.B.A. dual degree option allows students to earn both degrees in less time, through an efficient selection of courses.

Prospective students may submit one application to apply to both the Institute of Design and the Stuart School of Business programs.

Doctor of Philosophy

116 credit hours
Language examination
Comprehensive examination
Dissertation

The Ph.D. in design is a research program for those who wish to teach or conduct research in design. The program culminates with a dissertation that extends the body of knowledge about design theory and process. With the approval of their advisers, students may elect to study within the design planning or human-centered design tracks, or they may develop a different area of study that is important to the evolution of new knowledge in design theory or process.

Candidacy

Early in their studies, admitted doctoral students will be required to submit and obtain approval for a program of study and pass a foreign language requirement. Within two years of being admitted, and after approval of the program of study and passage of the foreign language examination, the student must take a comprehensive examination. This examination is intended as a rigorous

review of the level of competence achieved by the student as a result of the entire program of graduate study (except for the dissertation) as approved by the advisory committee and specified in the program of study form. Students are not considered candidates for the Ph.D. degree until after the comprehensive examination is passed.

Residence

The Ph.D. program normally requires a minimum of three years of study beyond the master's degree. The first four semesters must be continuous study at the Institute of Design. Students must enroll in at least 15 credit hours of course work for each of the first three semesters.

Language

Satisfactory reading knowledge of German, Japanese, French or Russian must be met before the student applies to take the comprehensive examination.

Curriculum

Totals 116 credit hours

Masters program in design

(32 hours or greater)

Research Sequence

(21 hours)

The research sequence is a series of projects and courses selected from available design workshops and specialty courses to meet the objectives of the student's research goals. Choices will be made in consultation with the student's adviser and will account for at least 21 credit hours of the required program beyond the M.S. degree.

Design Workshops

Workshops are major, semester-long project courses that explore design problems in breadth and depth. Processes and information from the specialty courses are developed here in practical and experimental applications. Choices are made in consultation with the student's adviser from ID classes numbered 580-589.

Specialty Courses

Specialty courses are courses in special branches of design theory, process or practice, and are normally selected from half-semester courses, ID 500-559 and ID 568-576.

Seminars

(6 hours)

Seminars are discussion courses that consider topics of contemporary interest and provide a continuing meeting ground and forum for students during their course and project work.

Electives

(12 hours)

Electives include full- or half- semester courses selected from the university's course offerings to complement objectives of the student's program. These courses should be at least 400-level and should be selected with adviser approval. Note: Summer research on projects designated by the department may substitute for up to three hours of elective or research sequence credit requirements.

Dissertation

(48 hours)

A distinct, substantial and original contribution to design knowledge. ID 691 Research and Thesis for the Ph.D.

Course Descriptions

Numbers in parentheses indicate class, lab and credit hours, respectively. Graduate standing in the Institute of Design is a prerequisite for all courses.

ID 428

Advanced Architectural Photography

Offers basic instruction in architectural photography primarily for upper level undergraduate and graduate level architecture students. Covers basic camera operation and exposure, photography of flat art and studio lighting, interior and exterior photography, and the photography of distinguishing features of the urban landscape. (1-2-2)

ID 482

Graduate Intro to Design

Instills familiarity with the professional practice of design in its main forms, disciplines and applications, including product design, communication design, design planning, design research, interaction design, service design and design education. Covers the skills required, activities, challenges, common tools and leading players in these areas of practice. Also covers design industry employment skills and basic drawing and visualization. (1-2-2)

ID 483

Graduate Intro to Communication Design 1

Provides a sound understanding of two-dimensional form and introduces basic concepts of graphic design, including factors of visual perception and syntax, principles of creating order and meaning, compositional techniques, aesthetic properties of visual form, information processing, and understanding the environmental, cultural and personal context of the viewer. Considerable emphasis is placed on typography. (1-2-2)

ID 484

Graduate Intro to Communication Design 2

Provides fundamentals for planning and editing information and communicating it in print, web, and

three-dimensional exhibition form, from concept generation to visualization. Relevant perceptual and cognitive principles are discussed. (1-2-2)

ID 485

Graduate Intro to Product Design 1

Teaches the fundamental principles and processes of product design through simple projects and skill building exercises, and study of more advanced projects and case studies. Skills taught include diagramming, orthographic sketching and rendering, basic three-dimensional model building, and documenting intent for presentation. (1-2-2)

ID 486

Graduate Intro to Product Design 2

Prepares students to practice basic product design and instills professional understanding of the responsibilities and value of product design to manufacturing organizations and end-users. Key topics include establishing design criteria, design ideation, geometry, structure and assembly, materials and fabrication, drawing, prototyping and solid modeling, and final presentation. (1-2-2)

ID 487

Graduate Intro to Photography

Acquaints design students with the field of photographic image making, how images are constructed and the ways they are used to communicate. Students learn the fundamental principles of image making, color theory, lighting, and digital image processing through the practice of creating images. All work is performed using digital cameras and software. (1-2-2)

ID 488

Graduate Intro to Digital Media

Surveys the basic media types used in interactive software. Includes a culminating project that demonstrates basic principles of screen design and computer-human interaction using a variety of media. Projects require use of common software applications for creating and

editing six data types: text, bitmap, geometry, sound, animation and video. (1-2-2)

ID 510

Principles and Methods of Design Research

Introduces the basic principles and methods for assembling, developing and analyzing information in the tasks of design research. Techniques for collecting data, testing hypotheses and presenting conclusions are learned in the context of conducting a pilot research project. (3-0-1.5)

ID 511

Philosophical Context of Design Research

Explores the philosophical framework for conducting research and building knowledge in the field of design. Topics include concepts from epistemology, phenomenology and structuralism. Comparisons are made between design research and research in other fields. (3-0-1.5)

ID 514

Design Planning

Introduces students to the context of design planning. It includes a discussion of the general forces acting upon an organization—competition, technological developments, channels of information and product distribution and ways to understand the people who use design. Particular attention is paid to how, within the context of all of these forces, design can benefit an organization. (3-0-1.5)

ID 515

Design Policy

Investigates the formation and intent of design policy by governments across the world. Particular attention is focused on the relationship of organizations implementing these policies to the political and economic structure of different countries and on measures assessing their success. (3-0-1.5)

ID 516

Observing Users

Introduces observational and ethnographic methods in design.

Ethnographic methods are used in fieldwork to help researchers develop a deeper understanding of the everyday activities of people's lives. In other words, their goal is to help researchers understand what people do -- not just what they say they do. In the design field, there is an added goal: to initiate practical changes in the ways people do things in the real, material world -- not just to make theoretical discoveries. Applied methods help designers conduct research projects and develop design solutions for customers, clients, or employers who seek out their expertise. (1-2-2)

ID 517
Design Languages

Covers the rhetoric of design case making using verbal, quantitative, visual, and spatial modes of persuasion. Includes a survey of document and presentation types useful in the product development process. (1-2-2)

ID 518
Business Frameworks

A descriptive course in business strategy for designers covering new venture strategy, competitive strategy, marketing strategy and tactics, decision sciences, entrepreneurship, private equity, business plan writing, innovation, introductory finance and "self-discovery." This course will build a series of non-mathematical models of success and failure in both entrepreneurial and corporate settings. (3-0-1.5)

ID 519
Economics & Design

This course will consider the relationship between theories and practice in the two very different realms of economics and design. Economic theory is a vital body of knowledge with many variations and emphases. It has fundamentally influenced a wide spectrum of both governmental and business policy and procedure and has enormous influence on how design is viewed in these contexts. (3-0-1.5)

ID 520
Communication Planning

Presents and demonstrates the principles and methods of formulating a

plan for a communication project, especially the relationship between the project plan and the organization's overall design strategy and policy. (3-0-1.5)

ID 521
Product Planning

Presents and demonstrates the principles and methods of formulating a plan for a new product, especially the relationship between the project plan and the organization's overall design strategy and policy. (3-0-1.5)

ID 522
Technological Development and Design Innovation

Concentrates on the exploitation of developments in material and manufacturing technology as a critical component in innovative design. Case studies are used to analyze the development of new products from precursor advancements in the technologies of materials and/or manufacturing. Product development is considered from perspective of project management, interactions among different technological domains, and the metaphoric transformation of design problems by design and development personnel aware of the technological advancements. (3-0-1.5)

ID 524
Strategic Design Planning

Focuses on how the processes and goals of design planning can relate to the overall strategic plan of an organization. It includes topics related to technological innovation, market trends, financial analysis and other forces that influence the future of an organization. (3-0-1.5)+

ID 525
Design Planning and Technological Innovation

Shows how design relates to technological change in media, manufacturing and products. Special attention is paid to the confluence of computing and communication, flexible production systems and the increased use of sophisticated electronics in control systems of products. (3-0-1.5)

ID 526
Design Planning and Market Forces

Focuses on methods in design planning that build information about how products and information should be used. It includes a comparison of marketing and design planning as distinct processes for developing new products, services and information. (3-0-1.5)

ID 528
Advanced Design Planning

Presents students with background information about the forces influencing a design problem. Using knowledge about planning processes, students will be asked to write a design plan that describes the relevant methods and predicted solution to the problem. (3-0-1.5)

ID 529
Structured Planning

Introduces the basic principles and methods of Structured Planning, a set of tools used in the planning phase of the design process. Procedures are developed for exploring the issues relevant to a project, obtaining detailed functional requirements and insights, organizing this information, synthesizing innovative concepts and describing them in a Plan for the subsequent designing phase. (3-0-1.5)

ID 531
Computer Applications in Design

Introduces students to the construction of computer programs for design. Issues of program design are considered, including modularity, data structures, computer graphic modeling, interface design and other aspects of programming for the support of design processes. Prerequisite: ID 468 or consent of instructor. (3-0-1.5)

ID 532
Computer-Supported Design Processes

Continuation of ID 531, with emphasis on advanced graphic techniques and artificial intelligence procedures for the support of design processes. Primary emphasis is on writing a complete design software application program. Prerequisite: ID 531 or consent of instructor. (3-0-1.5)

ID 533**Design Analysis**

A survey of design methods from many fields concentrating on problem definition, description and analysis. Among the topics covered are diagrammatic techniques for process and organizational description, semantic differential techniques, means/ends analysis and morphological analysis. (3-0-1.5)

ID 534**Design Synthesis**

A survey of design methods for enhancing creativity and developing concepts. Topics include morphological synthesis, a wide variety of creativity stimulation techniques, synectics and other group creativity processes. (3-0-1.5)

ID 535**Decision Support Techniques**

Covers methods for decision making and evaluation in design. Topics include criterion function analysis, decision making under varying conditions of certainty, utility theory, Delphi techniques for obtaining group consensus, and game and metagame theoretic processes for competitive decision making. (3-0-1.5)

ID 537**Artificial Intelligence and Design Problem Solving**

Introduces a variety of problem-solving and heuristic paradigms from artificial intelligence and cognitive science and explores their application in different types of design problem-solving processes. (3-0-1.5)

ID 540**Advanced Communication Design**

Involves students in practicing methods for rapidly developing prototypes that demonstrate appearance and/or functional aspects of potential messages. The class will include evaluation methods that are useful in the process of iteratively developing and testing alternate solutions. (3-0-1.5)

ID 541**Advanced Product Development**

Familiarizes students with the nature, methods, and design implications of current mass production practice and trends. Addresses the translation of product concepts into actual production by anticipating development needs in all portions of the manufacturing organization. (3-0-1.5)

ID 542**Interaction Design Methods**

This course focuses on a role of design to bring technologies to human contexts by creating interaction mechanisms for better user experiences. The content includes the concept of interaction, underlying theories, as well as methods for understanding user needs and contexts, representing different aspects of interaction, and designing and evaluating interactive systems. (3-0-1.5)

ID 543**Intelligent Products**

Introduces students to the professional and theoretical aspects of defining new products. Covers the process of creating a new product definition in detail, the characteristics of new product definition documents, and aspects of organizational structure and dynamics as they relate to developing new product definitions. (3-0-1.5)

ID 544**Interface Design**

Focuses on user-computer interface design. Topics included are cognitive models, interactive techniques, sign systems, display organization and prototyping methods. Prerequisite: Working knowledge of computer programming. (3-0-1.5)

ID 545**Interactive Media**

Introduces students to the principles of integrating electronic publishing, interactive video and computer graphics. Particular emphasis is on social and cognitive human factors and the use of multiple sign systems. Prerequisite: ID 544 or consent of instructor. (3-0-1.5)

ID 546**Diagram Development**

Explores the language of diagrams and alternative techniques for increasing communication effectiveness. Subjects of study include computer-based diagrams that introduce interaction and motion to convey meaning. (3-0-1.5)

ID 547**Product Architecture and Platform**

Product architecture is the structure that integrates components and subsystems of a product into a coherent mechanism to perform intended behavior and functions. It also reflects rationale and intentions of the design from different perspectives. In order to accommodate a wide range of user requirements and social concerns as well as fast changing technologies, strategic approaches and methodologies for designing product architecture and platform need to be incorporated in the design process. This course introduces the concept of product architecture and platform to explore their possible applications to different types of products from different viewpoints. (3-0-1.5)

ID 548**Life Cycle & Sustainable Design**

Life Cycle & Sustainable Design introduces students to the issues, resources, and methods of designing product systems with consideration for their environmental and social impact throughout their lifecycle. The course is formatted to help students develop a professional point of view and set of references for assessing lifecycle and sustainable issues when developing new products. (3-0-1.5)

ID 549**Prototyping Methods**

The ability to make prototypes and experiment with them before a final product is developed greatly enhances the product development process. This course introduces and explores a wide variety of prototypes and how they can be used to inform new product development. How prototyping affects understanding of the project goals, management of the

process, project risk, learning, and quality are explored. Paper prototypes, architecture & platform prototypes, behavioral prototypes, interactive prototypes, visualizations, simulations are examples of the types of prototypes that are examined. (3-0-1.5)

ID 551**Cognitive Human Factors**

Presents the advanced ideas and methods that can be used to design information and products that fit the cognitive abilities of people. Important topics include designing information that corresponds to mental models of users, control systems that help users develop appropriate mental models and the analysis of different methods of representing information. (3-0-1.5)

ID 552**Social Human Factors**

Presents advanced ideas and methods used to design information, products and environments that fit the social patterns of groups. Particular attention is paid to understanding and designing systems that support group work. (3-0-1.5)

ID 553**Cultural Human Factors**

Presents ideas and principles used to understand the relationship between design and cultural values and behavior. Emphasis is placed on designing information and products for people who are from significantly different cultures. (3-0-1.5)

ID 554**Visual Language**

Discusses pictures, abstract symbols, text, numbers, diagrams, three-dimensional form and other sign systems. Particular attention is paid to the relative advantages of each representation system for conveying different types of information. (3-0-1.5)

ID 555**Metaphor and Analogy in Design**

Investigates the ideas and methods for creating visual messages through comparing, juxtaposing and substituting images within specific

contexts. Discussion will include issues of similarity, such as isomorphism and analogy, the connotative attributes of images, and the dissonance found in metaphors and other rhetorical forms. (3-0-1.5)

ID 557**Dynamic Diagrams**

The study and development of real-time, computer-based diagrams for pattern finding and pattern communicating. Particular attention is paid to the roles of motion, interaction, sound, and modes of manipulation that can be combined with 3-D models and traditional diagrammatic sign systems. Prerequisite: ID 546 or consent of instructor. (3-0-1.5)

ID 558**Theories of Information and Communication**

Describes general paradigms of information and communication. Particular attention is paid to models that consider the importance of the values, behavior and knowledge of the people for whom the information is intended. (3-0-1.5)

ID 559**Physical Human Factors**

The physical aspect of human experience and interaction design is investigated through topics such as “learning by doing”: interaction between actions and cognition, physical interface: enhancement of cognitive activities, spatio-temporal dimensions of interaction design, and the “shared reality” concept for multi-modal communication. (3-0-1.5)

ID 567**Economics of Product Development**

Successful new products drive the growth and profitability of organizations. But the development of these new products relies on considered investments, quality development processes, and an expected return on the investment. This course introduces the numerous economic considerations and measures with which the successful new product developer must be familiar. Project budgeting, return on investment, net present value, cash flow analysis, product pricing, and budgeting are

among the concepts explored from a design and development viewpoint. (3-0-1.5)

ID 568**Research Methods for New Product Development**

The design and development of new products requires rigorous research throughout the process to improve insight and reduce the risk of innovation. Ethnographic and activity-based methods are used early to identify latent needs. Behavioral testing with prototypes is used to understand the quality of emerging concepts. Quantitative and qualitative validation studies help understand final concepts in detailed ways. This course examines research methods used throughout the design and development process from process, financial, and results standpoints. (3-0-1.5)

ID 569**Intellectual Property**

The opportunity to protect one’s unique and valuable ideas is a core tenet of the global economic system and is embodied in the laws of intellectual property. Disciplines such as design and engineering that are involved in the development of new ideas must actively pursue this protection. This course introduces the principles and methods for securing intellectual property rights. Topics covered include utility and design patents, trademark, copyright, and trade dress. Emphasis is placed on the ability to articulate novelty, the appropriate process of securing intellectual property, and common ways intellectual property can be valued. (3-0-1.5)

ID 572**Systems and Systems Theory in Design**

Investigates principles and methods for exploring the behavior of systems. System dynamics techniques are used to model design concepts with the goal of revealing complex, non-ceptive relationships. Important topics include general systems theory, modeling, causality and formalisms. (3-0-1.5)

ID 577**Product Form**

The form of a product is a result of resolving technical conditions, organizing the product for use, and a means for communicating. In this course students examine what technical and social dimensions impact product form and conversely, how product form can be controlled by the designer to improve the product's performance. Topics include the relationship between a product's form and corporate identity, visual trends, new materials, semantics, product architecture, ergonomics, specific industries, and others. (3-0-1.5)

ID 578**Design Planning Implementation**

Introduces frameworks and methods for effectively implementing change in organizations. Using cases, students will explore key failure modes, which undermine initiatives. In addition, students will identify principles, actions and measures that mitigate risk, improve implementation success, and inform stronger designs. (3-0-1.5)

ID 579**Production Methods**

An introduction to the common methods used to produce or manufacture products. Alternative processes, materials and finishing methods, relative costs and applicability to design of products will be explored. (3-0-1.5)

ID 580**Design Workshop**

Involves students from across the programs in projects that demonstrate how new theories and processes can be applied to complex design projects. (Credit: Variable)

ID 581**Photography Workshop**

Involves students in a major project that is in the context of contemporary ideas in photography. (Credit: Variable)

ID 582**Communication Design Workshop**

A project-oriented workshop focusing on design principles that link theoretical methods to practice in the area of human-centered communication design. Prerequisite: Graduate standing in design. (Credit: Variable)

ID 583**Product Design Workshop**

A project-oriented workshop focusing on design principles that link theoretical methods to practice in the area of human-centered product design. Prerequisite: Graduate standing in design. (Credit: Variable)

ID 584**Design Planning Workshop**

A project-oriented workshop that involves students in analyzing user needs, conceiving of innovations, and developing plans for new communications, products and businesses. Students will present their ideas through plans, prototypes and demonstrations. Prerequisite: Graduate standing in design. (Credit: Variable)

ID 588**Interactive Media Workshop**

A project oriented survey of the methods and issues in the creation of interactive multimedia software. Methods will cover the use of several authoring systems and the effective use and combination of the five basic data types: text, graphics, sound, animation and video. Issues addressed will be metaphor, mapping, informational organization, interactive strategies, navigation, tailoring and alternative communication models for user-controlled environments. Prerequisite: Graduate standing in design. (Credit: Variable)

ID 589**Systems Design Workshop**

Introduces the application of structured planning methods to complex design problems at the system level. Team techniques are emphasized, and formatted information handling and computer-supported structuring processes are used at appropriate stages of project definition, information development, structuring, concept development and communication. Corequisite: ID 529. (Credit: Variable)

ID 592**Research and Demonstration Project for M.Des. Degree**

(Credit: Variable)

ID 598**Special Problems**

(Credit: Variable)

ID 685**Research Seminar**

Investigation and discussion by faculty and students of topics of interest from different perspectives such as building a design research discourse (reading research papers critically, selecting among publication venues); investigating alternative philosophical bases for design research (comparing empirical, pragmatic, and phenomenological approaches); or exploring methodological and theoretical conflicts in design research. (3-0-3)

ID 691**Research and Thesis for Ph.D.**

(Credit: Variable)